

## *2.0 The Proposed Project/Action*

### *2.1 Introduction*

This chapter describes the proposed project or action, including a summary of the effects of the proposed operation on the hydrodynamics of the Sacramento-San Joaquin Delta. The proposed project and each of its five components are described in the following section.

### *2.2 Proposed Interim South Delta Program*

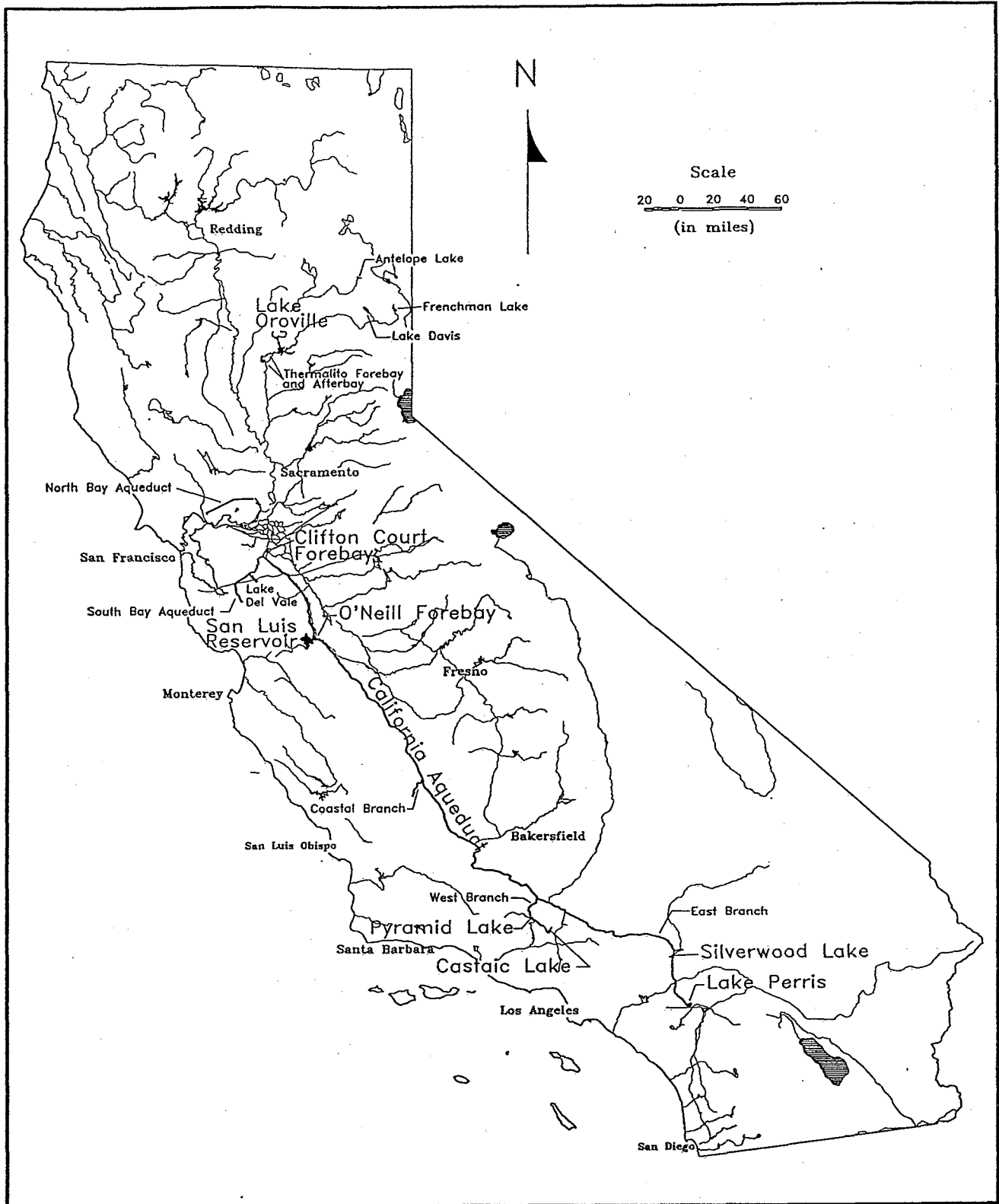
The Interim South Delta Program is a proposed action to settle pending litigation against the USBR and DWR; and enhance the existing water delivery capability of the State Water Project (Figure 2-1). The proposed ISDP (Figure 2-2) would cost \$53.9 million to construct and includes five project components: (1) construction and operation of a new intake structure at the SWP Clifton Court Forebay; (2) channel dredging along a reach of Old River just north of Clifton Court Forebay; (3) construction and seasonal operation of a barrier in spring and fall to improve fishery conditions for salmon migrating along the San Joaquin River; (4) construction and operation of three flow control structures to improve existing water level and circulation patterns for agricultural users in the south Delta; and (5) increased diversions into Clifton Court Forebay up to a maximum of 20,430 acre-feet per day on a monthly averaged basis resulting in the ability to pump an average of 10,300 cfs at Banks Pumping Plant (with additional annual average SWP water deliveries of 46,000 acre feet per year under existing demand conditions and 122,000 acre feet per year under future demand conditions, estimated for the year 2020). Each of these five components is discussed in the following subsections. (Table 2-1 provides the physical features and costs of the proposed project components.)

#### *2.2.1 Component 1: Construct And Operate A New Intake Structure At The SWP Clifton Court Forebay*

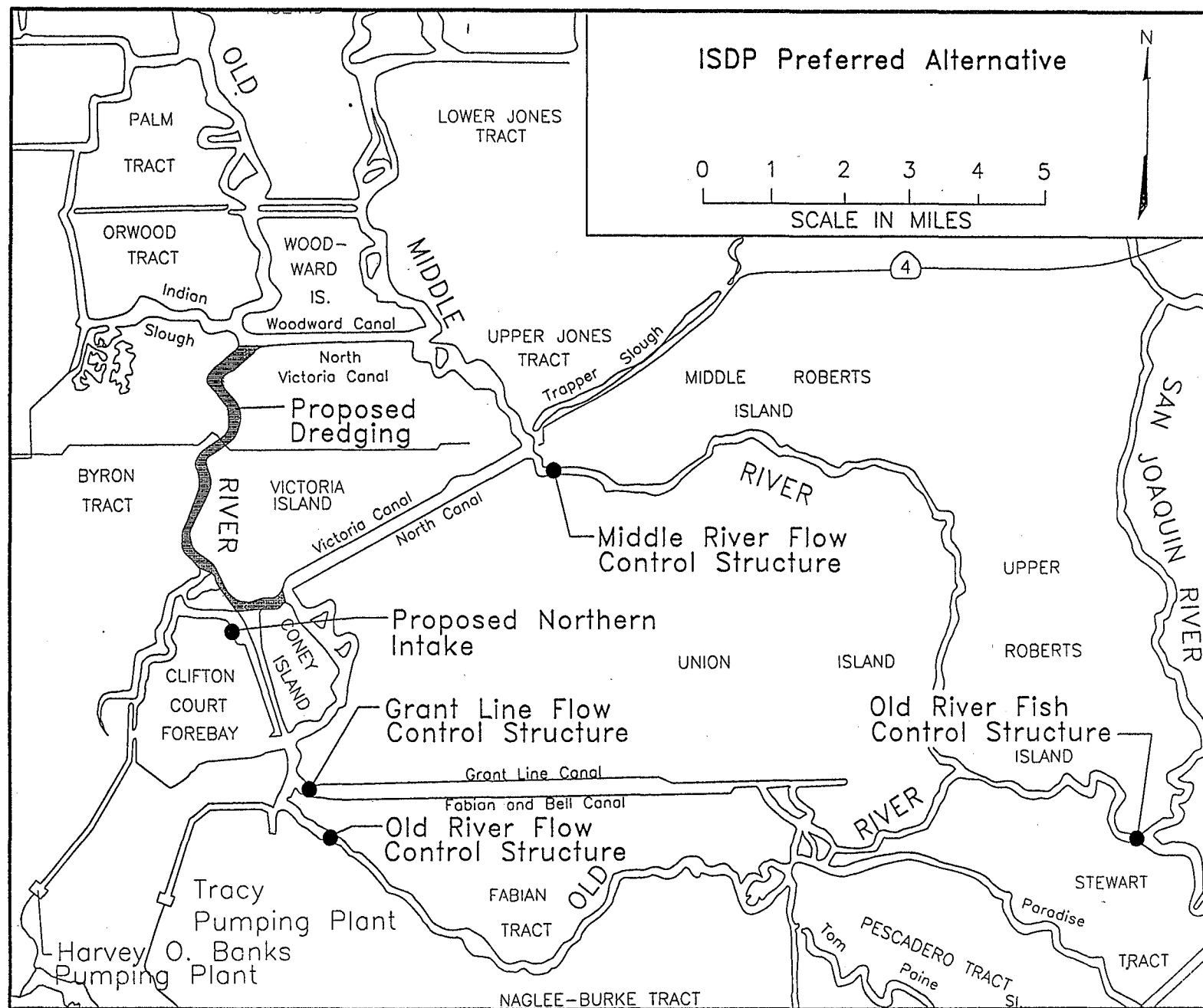
A new intake would be constructed at Clifton Court Forebay and operated to complement the operation of the existing intake structure. Both of these intakes would be necessary to utilize the full pumping capability of the existing pump units at the Harvey O. Banks Delta Pumping Plant under the variety of possible physical conditions in the Delta. Both intakes would be operated to allow water to enter the forebay when the water level in Old River is higher and to prevent water from flowing out of the forebay when the water level in Old River is lower.

The proposed intake would include a 200-foot by 60-foot by 28-foot concrete structure with six steel radial gates, each 30 feet wide by 29 feet high (Figures 2-3 and 2-4). The structure would be located within the Clifton Court Forebay embankment. A cellular cofferdam 1,100 feet long would surround the west side of the structure to allow construction of the intake in the dry. An equipment storage pad 100 feet by 55 feet would be located adjacent to the concrete structure.

Approximately 2,600 linear feet of new levee sections would be constructed from West Canal to Clifton Court Forebay. The trapezoidal channel would have three feet horizontal to one foot vertical side slopes.



**Figure 2-1. State Water Project (SWP) Facilities.**



**Figure 2-2. Interim South Delta Program Facilities.**

Table 2-1  
Physical Features of Proposed Project

	Intake Structure	Channel Dredging	Head of Old River Barrier	Middle River Barrier	Grant Line Barrier	Old River Barrier	Totals
Type of Gates	Radial	None	Vert. Lift	Radial	Radial <sup>1</sup>	Radial <sup>1</sup>	N/A
Number and Dimensions of Gates	6@30x29	None	8@45x10	2@25x16	4@20x16	3@20x15	N/A
Capacity (cfs)	30,000	21,000	N/A	N/A	N/A	N/A	N/A
Structure Footprint (ft x ft)	200x60	N/A	415x35	250x55	600x100	400x100	N/A
Storage Pad (ft x ft)	100x55	None	60x200	60x200	60x100	60x100	N/A
Boat Passage Facility	-	None	Jib Crane	Boat Ramp	Boat Lock	Boat Lock	N/A
Excavation (cy)	13,000	-0-	1,700	600	33,800	85,100	254,200
Embankment (cy)	161,000	-0-	6,500	7,700	49,700	34,400	259,300
Structural Concrete (cy)	1,600	-0-	1,200	200	4,600	2,300	9,900
Levees Constructed (lf)	2,600	-0-	-0-	-0-	-0-	1,000	3,600
Levees Removed (lf)	1,600	-0-	-0-	-0-	-0-	1,000	2,600
Riprap (sf)	106,000	-0-	11,000	25,000	30,000	49,000	221,000
Channel Dredging Length (mi)	-0-	4.9	-0-	-0-	-0-	-0-	4.9
Channel Dredging Amount (mil cy)	-0-	1.25	-0-	-0-	-0-	-0-	1.25
Forebay Enlargement Increase in Size (ac)	-0-	-0-	-0-	-0-	-0-	-0-	-0-
Construction Period (mos)	30	36	30	18	36	30	18-36
Construction Crew	70	10	80	50	90	100	10-100
1/96 Estimated Cost (\$ million)	17.5	3.4	5.7	3.9	15.6	7.8	53.9

<sup>1</sup> Also, 50-ft-wide flashboard opening

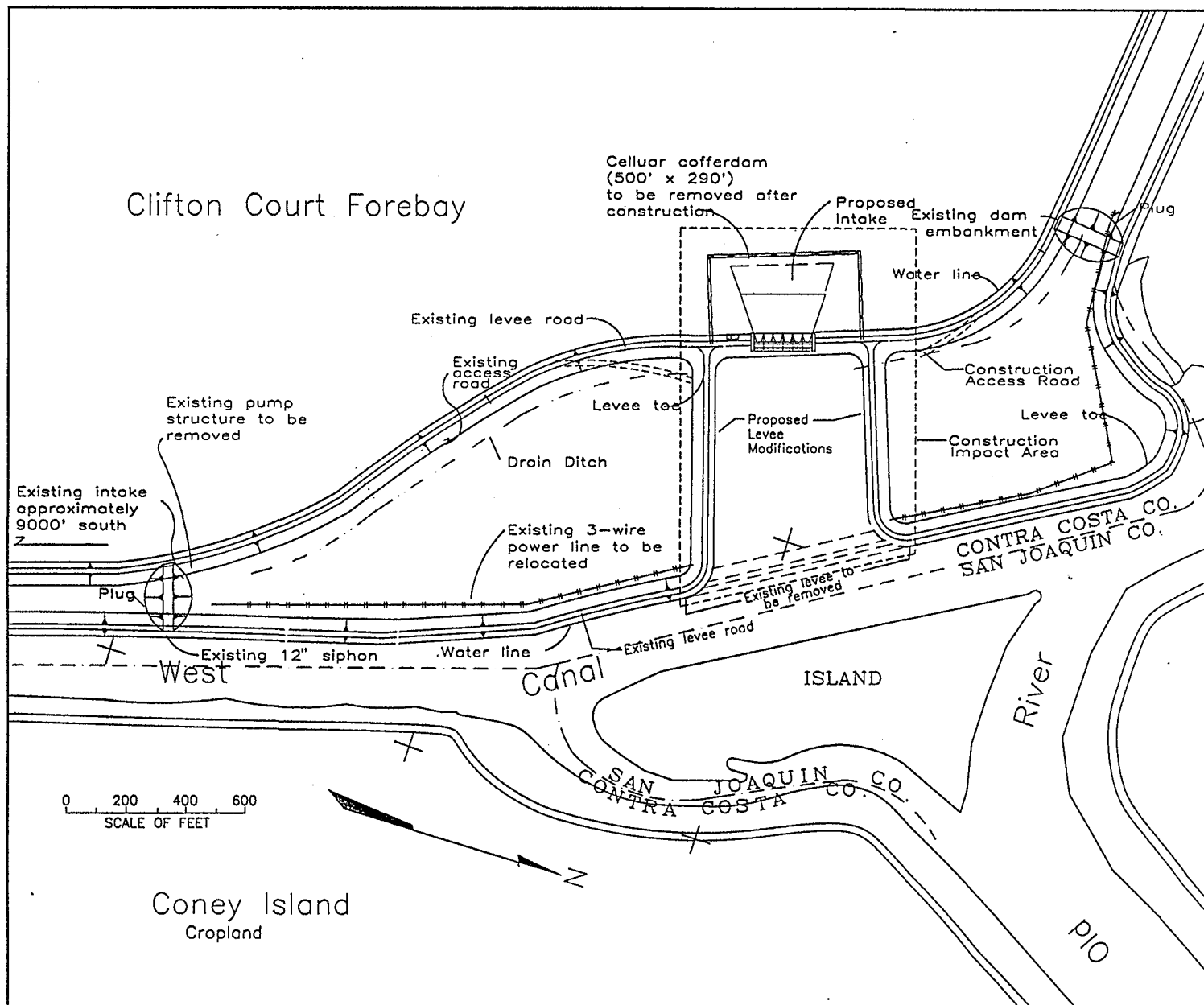


Figure 2-3. Proposed Northern Intake.

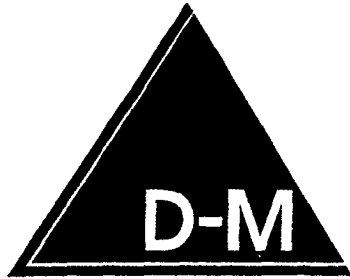


Figure 2-4. CCF Proposed Intake Structure.

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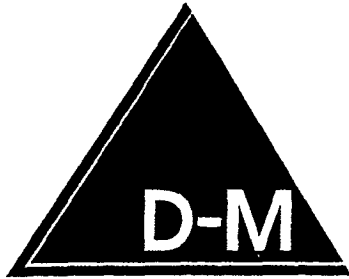
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About 161,000 cubic yards (cu. yds.) of embankment material are required to construct the new levees and equipment storage area. Filled areas would be brought to an elevation of 14 feet with side slopes of three feet horizontal to one foot vertical<sup>1</sup>. The entrance channel and exit channel would be protected with rock riprap.

The new intake structure would be similar to the existing intake structure in configuration and operation. It would be operated either simultaneously with or independent of the existing intake, depending on the amount of water to be diverted into the forebay, specific tidal conditions, water quality, or other factors. To retain the water in the forebay, the radial gates would be closed when the water level outside of the forebay recedes. Based on detailed modeling results to date, the additional intake could divert a peak flow of 30,000 cubic feet per second (cfs) during the flood tide and an average flow over the tidal cycle of about 10,000 cfs. Current peak flow diversions are limited to 15,000 cfs.

The construction period would last approximately 30 months with a construction crew of about 70 people. The estimated cost of the new intake facility is \$17.5 million.

### *2.2.2 Component 2: Perform Channel Dredging Along A Reach Of Old River Just North Of Clifton Court Forebay*

The modeling and physical testing carried out for the proposed ISDP showed that dredging the Old River from the Western Canal to the confluence of Old River and North Victoria Canal is necessary to allow the full pumping capability of Banks Pumping Plant while avoiding sediment movement and scouring during peak diversion periods (Figure 2-5). The dredged material would be dried and then used for levee reinforcement and other beneficial re-use projects in the Delta.

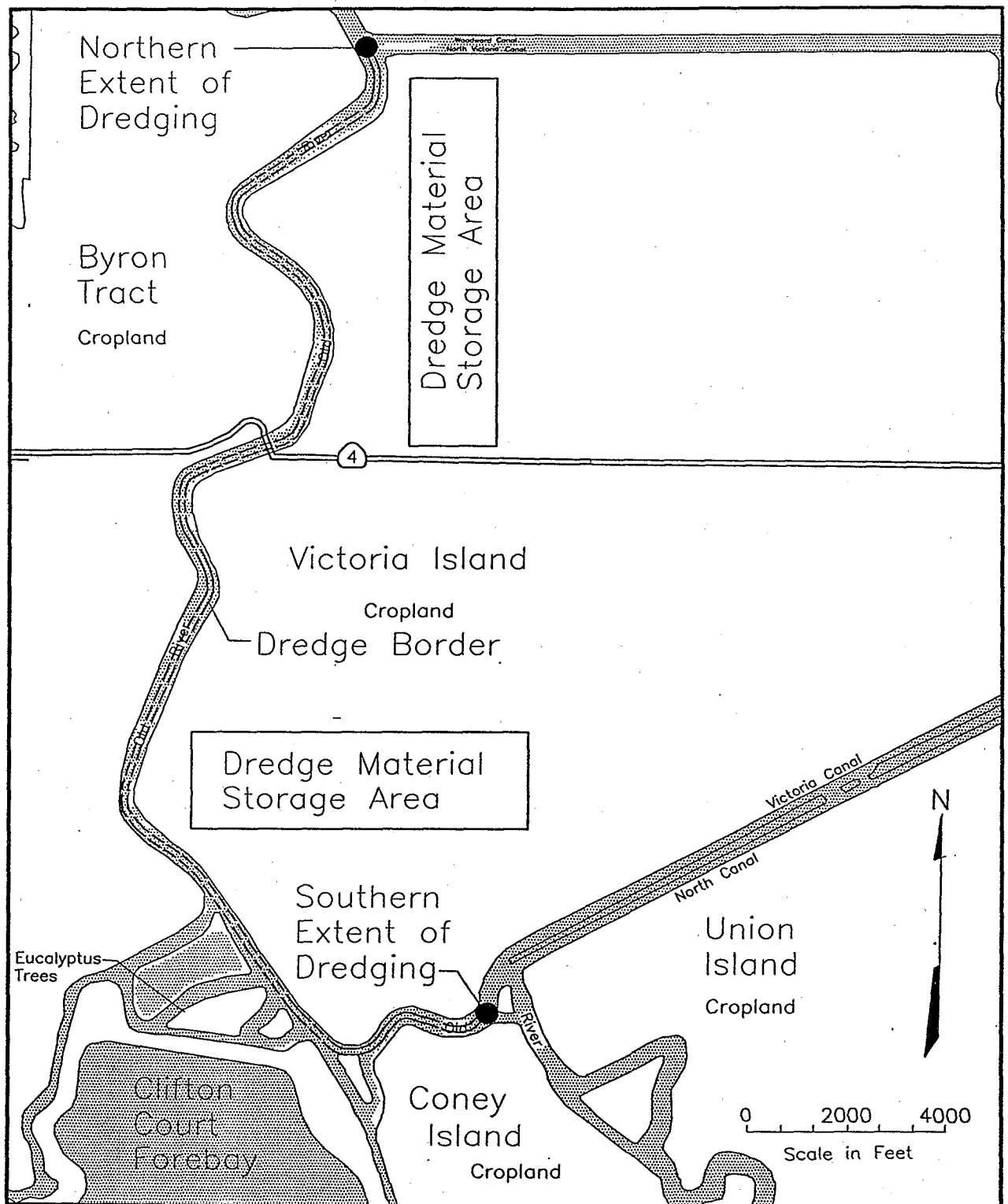
Approximately 1.25 million cubic yards of material would be dredged from a 4.9-mile reach of Old River to increase the channel capacity north of the new intake. The potential for levee instability would be alleviated through the adherence to the following design criteria: limiting removal of material to the center two-thirds of the width of the existing channel; maintaining a minimum side slope of 3:1 along the new cross sections; and designing series of benches for the new cross section.

The dredging would be accomplished using either a cutterhead suction dredge or a clamshell dredge, depending on the availability of disposal sites on Victoria Island, Byron Tract or Twitchell Island. Hydraulic dredging, using a cutterhead suction dredge, would be used if either the Victoria Island or Byron Tract sites are selected. Mechanical dredging, using a clamshell dredge, would be used if the Twitchell Island site is selected. Silt curtains would be used to minimize turbidity in the immediate area caused by the suction dredging operation.

The proposed dredged material disposal site, located on Victoria Island, would consist of two settling ponds (Figure 2-5). Both ponds would be located south of Highway 4. Each pond would cover approximately 300 acres, for a total of about 600 acres. The northern pond would be approximately 7,500 feet long and 1,750 feet wide. This pond would contain six separate settling basins, each separated by a levee and drained by corrugated metal pipes to facilitate the settling of dredge materials. Once the dredged solids have been decanted, the remaining water would be drained into the existing agricultural drainage ditch on Victoria Island and then pumped back into

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<sup>1</sup> This is consistent with the recommendations of Reclamation District 800.



**Figure 2-5. Channel Dredging, Old River.**

Old River. The southern pond would be approximately 6,800 feet long and 2,000 feet wide. This pond would also contain six separate settling basins and would be operated in the same way as the northern pond. Each of the proposed settling ponds would be contained by dikes four feet high. Containment dikes would be constructed of native materials. Drainage between basins would be accomplished using corrugated metal pipes.

The material contained in the settling ponds is expected to take many months to drain. Once the dredged material is dried, it would be placed on the back side of the existing levees or used for other beneficial reuse projects. Sediment would be placed on the back side of the levee by creating a berm that reinforces the integrity of the structure and minimizes the chance of failure. The task would be completed under supervision of a licensed geotechnical engineer, and measures would be taken to control potential settlement. Preliminary soil testing has been conducted to analyze the integrity of the existing foundation. Dredged material would be placed gradually over a period of time to control and monitor potential subsidence. In May 1994, 60 discrete samples were also collected from Victoria Island at proposed settling pond and levee disposal sites for a chemical analysis of the soils. The results are discussed further in Section 5.3.4.

The dredging operation period would last approximately 36 months with a construction crew of about ten people. However, dredging will only take place between August and October, to minimize impacts to fish habitat. The estimated cost of dredging and disposal using the Victoria Island site is approximately \$3.4 million (or \$3 per cubic yard of material), not including the indirect costs of lost agricultural production on the 600-acre site (those costs are discussed in Section 15.3.1). There would be additional costs associated with moving the drained material from the settling ponds once drainage is complete, however, these costs have not yet been estimated.

An alternative site under consideration for dredged material disposal includes approximately 360 acres on Byron Tract, located west of Old River adjacent to Victoria Island (Figure 2-6). Material would be removed hydraulically and pumped into settling ponds on Byron Tract. It is anticipated that the length of discharge pipeline would not be greater than 7,000 feet to the disposal site for this task. Two settling ponds similar to those proposed on Victoria Island would be constructed, one pond immediately south of Highway 4 and the town immediately north of Clifton Court Road. The portions of Byron Tract under consideration are currently in agricultural use. One of the major land owners in this tract has expressed an interest in acquiring the dredge material and DWR is working on specifics. A soil chemical analysis has not yet been completed for this site, but it is expected that disposal costs for this site will be similar to those at Victoria Island.

A third possible disposal site for dredged material is Twitchell Island (Figure 2-7), which is located in the western Delta north of San Joaquin River and east of Sherman Island. More than 80 percent of the island is owned by DWR and leased for managed farming. Approximately 100 acres adjacent to San Joaquin River along the back sides of the levee would be used, however, none of this acreage is in agricultural production. The dredged materials would be removed by mechanical dredger and transported to the island for drying and future use on levees. A mechanical dredger, either clamshell or dragline, operates from a barge positioned within a small area. The clamshell has a mounted crane to lift the material out in a bucket, while the draglines are typically attached to a crane and worked off of a barge. Dredge material is loaded onto barges, towed to the disposal site and the material is removed.

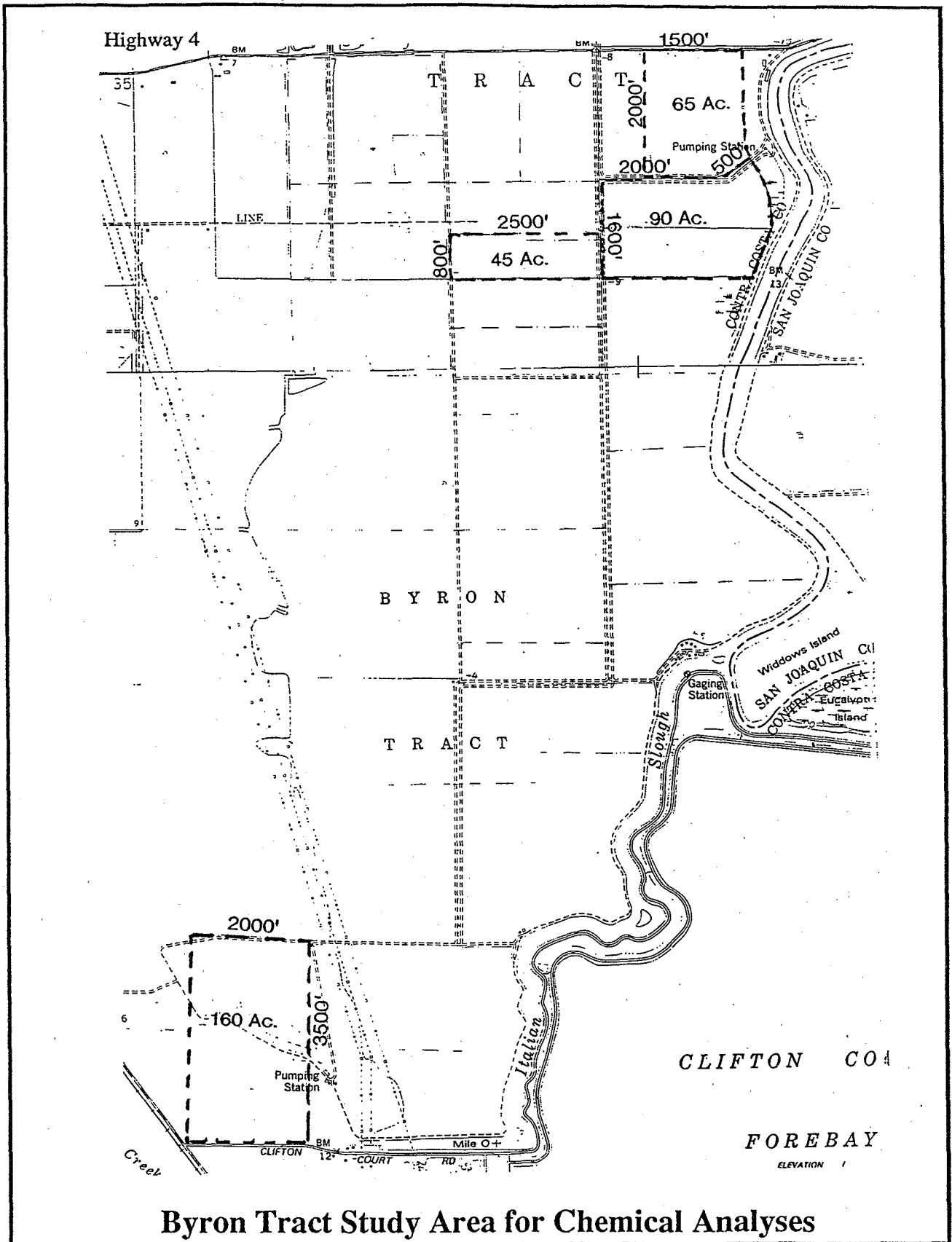


Figure 2-6. Byron Tract Study Area for Chemical Analyses.

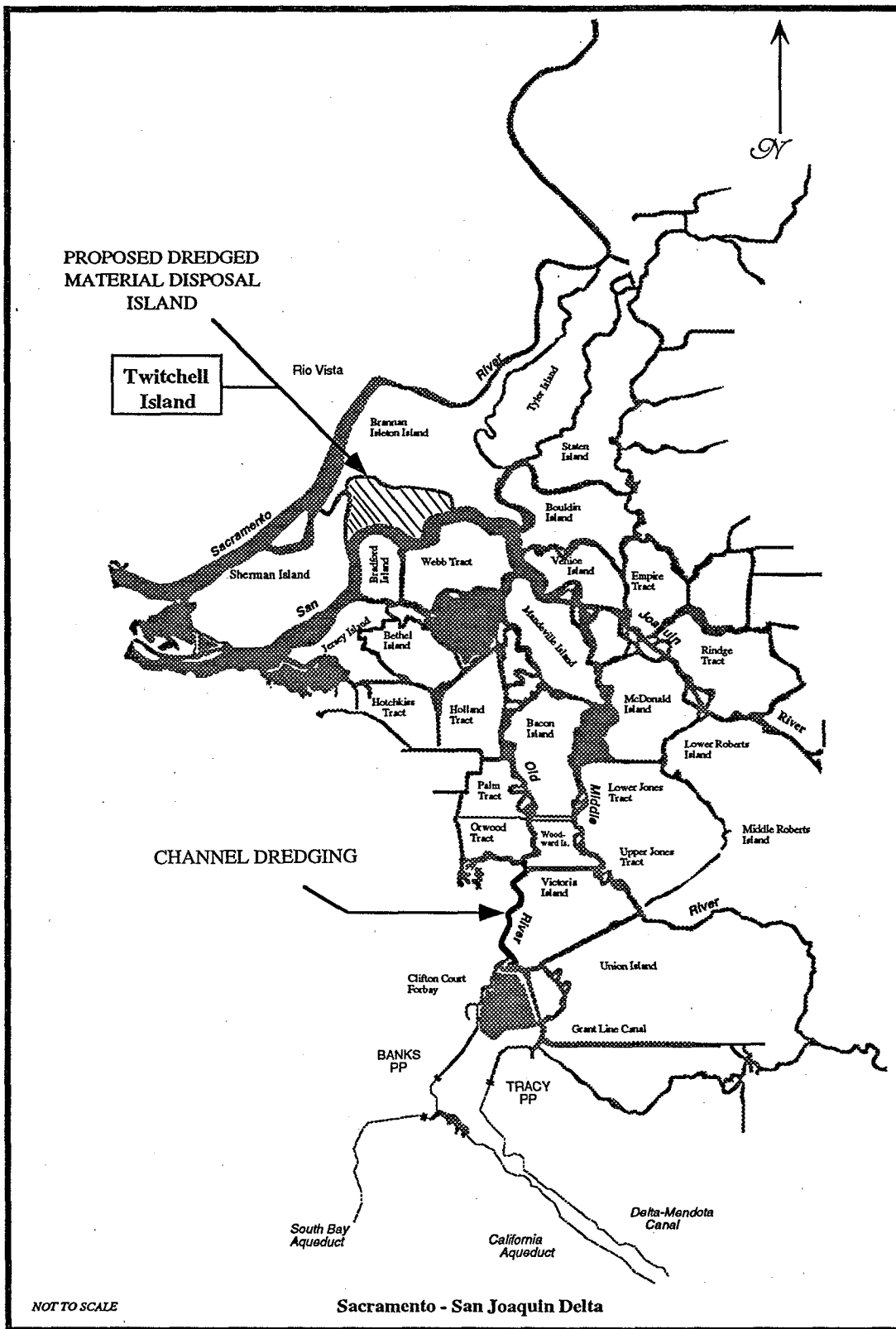


Figure 2-7. Relationship Between Twitchell Island and Channel Dredging Area

Twitchell Island is about 25 miles from the project dredging area. The estimated cost of dredging, transportation and disposal is \$11.50 per cubic yard of material. These costs are much higher due to the expense of transporting the material by barge. DWR has collected soil samples and performed chemical analyses on 70 acres of Twitchell Island.

### *2.2.3 Component 3: Construct And Operate A Barrier Seasonally Both In Spring And Fall To Improve Fishery Conditions For Salmon Migrating Along The San Joaquin River*

The proposed Old River fish control structure would be 415 feet long and 35 feet wide. It would be located at the confluence of the head of Old River and the San Joaquin River (Figures 2-8 and 2-9). The structure would be constructed of concrete and would have eight vertical lift gates, each measuring 45 feet long by 10 feet high. Each opening would have two lift gates, stacked vertically. A permanent storage area would be constructed for the vertical lift gates, equipment, and operator parking. The access to the storage area would be controlled by fencing and gates. The vertical lift gates would be raised or lowered by a traveling gantry crane which would be permanently mounted to the barrier. A stationary jib crane, also permanently mounted to the structure, would be used to transfer boats from one side to the other via a sling apparatus when the gates are in place. Docking facilities and stairways to accommodate the transfer of boat passengers from one side to the other would be provided. Miscellaneous features associated with the structure would include floating and pile-supported warning signs, water level recorders, and navigation lights.

The fish control structure would be operated from October through November and from April 16 through May of each year except during periods of high San Joaquin River flows. During periods of operation, no flow would occur across the barrier. The operations during the fall would be aimed toward improving the dissolved oxygen levels along the portion of the San Joaquin River from its confluence with the head of Old River downstream to the Port of Stockton. The operations during the spring would be aimed at enhancing the survival of emigrating San Joaquin River salmon smolts by lessening the chances of exposure to the influences of project and local diversions which occur in the south Delta during this time. The exact timing of both the fall and spring operations could be modified annually, in coordination with the Department of Fish and Game. Consultation with the National Marine Fisheries Service and the U.S. Fish and Wildlife Service would also be initiated to avoid impacts to winter-run salmon and delta smelt. The gates would remain fully raised during the non-operational times of the year.

The project would be built within the confines of the existing channel; therefore, no relocation of the existing levees is proposed. People and equipment would access the project by an existing county road or by the construction of a private access road. The roads, which would be at least 16 feet wide and composed of gravel, would accommodate large cranes (40 tons) and loaded 10-wheel trucks.

Construction would occur in three phases. Each of the first two phases would utilize half of the channel cross-section. Phase one and phase two of the structure would be constructed with the use of sheet-pile braced cofferdams. The equipment storage area and remaining fixtures would be constructed in the third phase. Upon completion of each construction phase, the sheet-pile cofferdam would be removed. Approximately 1,700 cu. yds. of channel excavation would be required from a 9,500 sq. ft. area to construct the substructure for the lift gate structure. Excavation

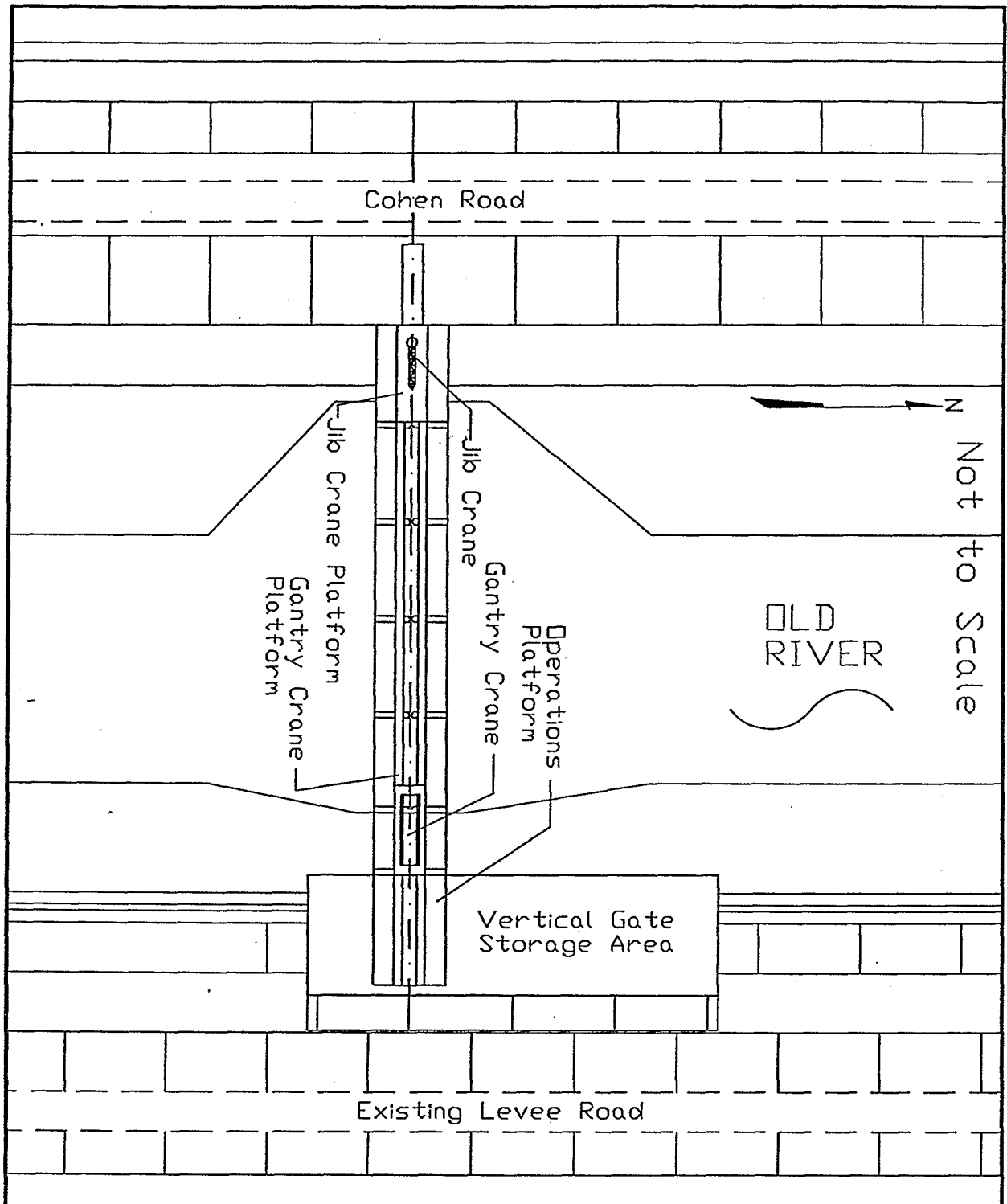


Figure 2-8. Old River Fish Control Structure.

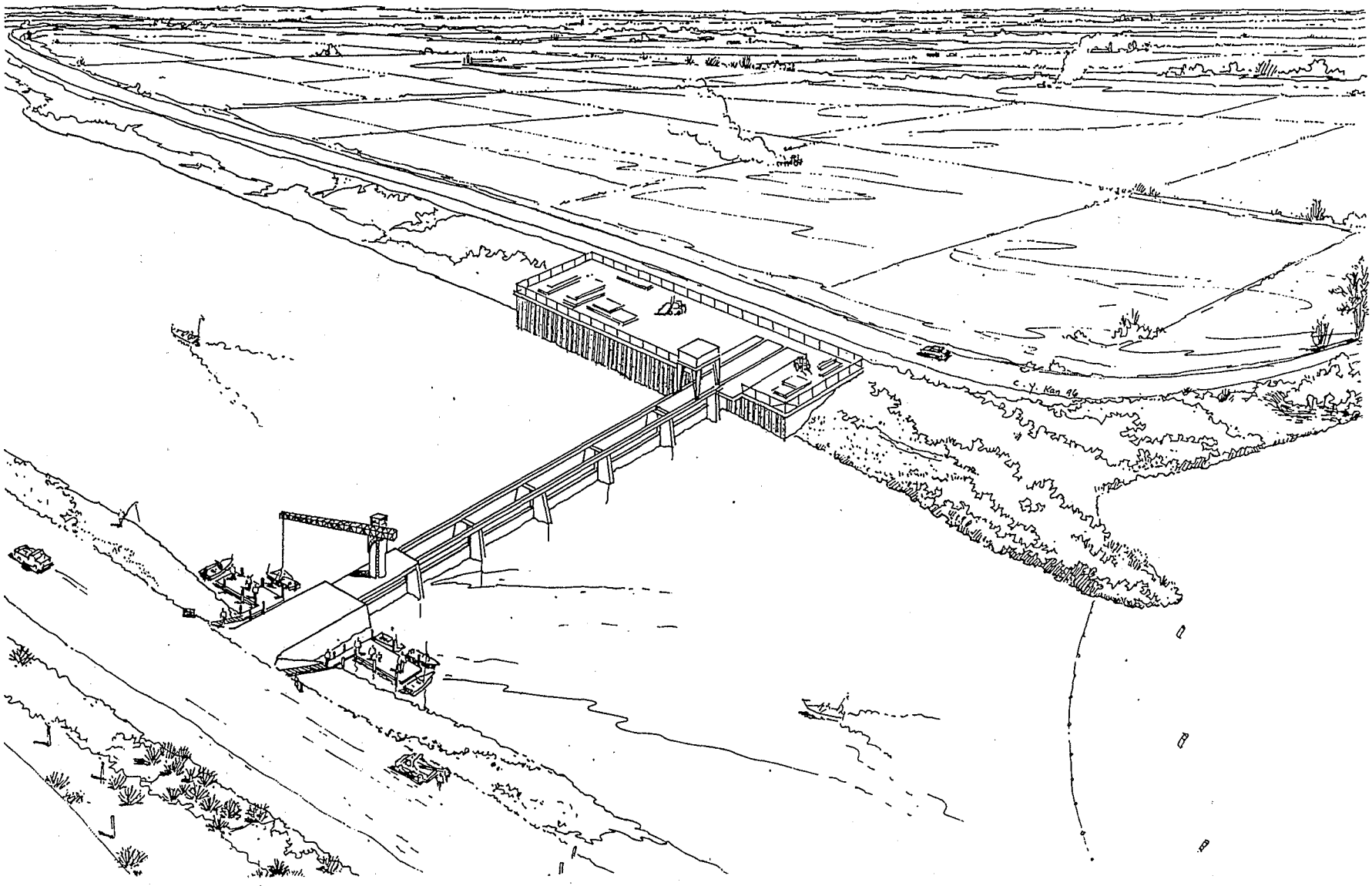


Figure 2-9. Old River Fish Control Structure

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would be accomplished using equipment such as cranes with clamshell buckets, front-end loaders, or bulldozers. Excavated materials would be disposed of on-site or would be loaded into trucks or barges for disposal off-site.

The concrete structure would require approximately 1,200 cu. yds. of structural concrete and 117 tons of reinforcing bars. Approximately 11,000 sq. ft. of riprap would be used as slope protection on existing levees near the barrier. The construction period is estimated to be 30 months with a maximum construction crew of 80 people. The estimated cost is approximately \$5.7 million.

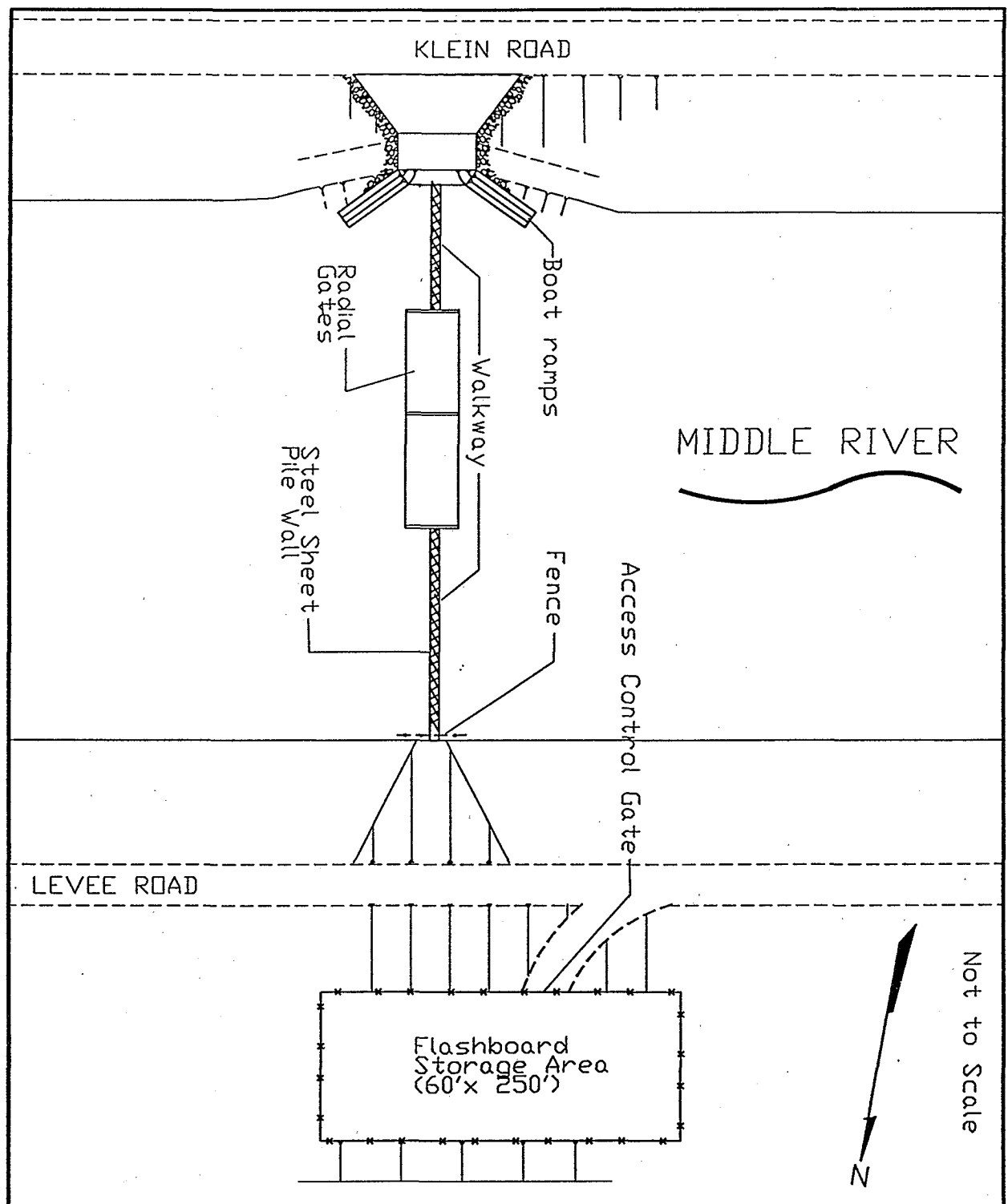
#### *2.2.4 Component 4: Construct And Operate Three Flow Control Structures To Improve Existing Water Level And Circulation Patterns For Agricultural Users In The South Delta*

Three flow control structures at Middle River, Grant Line Canal, and Old River would be constructed and operated as a part of the proposed ISDP. The operation of the three flow control structures would vary over the course of the irrigation season: 1) Middle River from April through October, 2) Grant Line Canal from June through September, 3) Old River from April through October. The Middle River and Old River structures would be operated to allow water to pass upstream into the controlled reaches during higher tides and prevent water levels within the controlled reaches from dropping as the higher tides recede. The Grant Line structure would be operated to allow water to pass upstream into Grant Line Canal during higher tides. In addition, a small amount of downstream flow would be permitted to pass across the Grant Line structure during both low tides. All three structures would allow flows to pass freely during the periods of natural or regulated high flow, when water levels are maintained without the need for flow control. The facilities associated with each of the three flow control structures are described as follows.

- *Middle River Flow Control Structure*

The proposed Middle River Flow Control Structure would be located in Middle River, San Joaquin County, near the confluence of Middle River with Victoria Canal, North Canal, and Trapper Slough, approximately 13 miles southwest of Stockton. The Middle River Flow Control Structure (Figures 2-10 and 2-11) includes two 25-foot-wide by 16-foot-high radial gates housed in a reinforced concrete gate bay structure, boat ramps, steel sheet-pile wall and a permanent storage facility. The structure's footprint is roughly 250 feet long by 55 feet wide. A permanent storage area, which would be located on the landward side of the north levee, is also included. This storage area, 200 feet long by 60 feet wide, would be used to store equipment and provide vehicle parking. It would be bounded by a 6-foot-high chain link fence with an access gate. Boats and people would be transferred with the use of boat ramps.

Since the Middle River channel is shallow, about 7.0 feet deep at this location, this structure would be constructed by placing a braced cofferdam and building the structure within the cofferdam by conventional construction techniques. Construction would be undertaken in three phases. Phase one would include the construction of one half of the radial gate structure utilizing a cofferdam. Phase two would include the construction of the other half of the structure. Upon completion of each construction phase, the cofferdam sheet piling would be cut at the required invert depth.



**Figure 2-10. Middle River Flow Control Structure.**

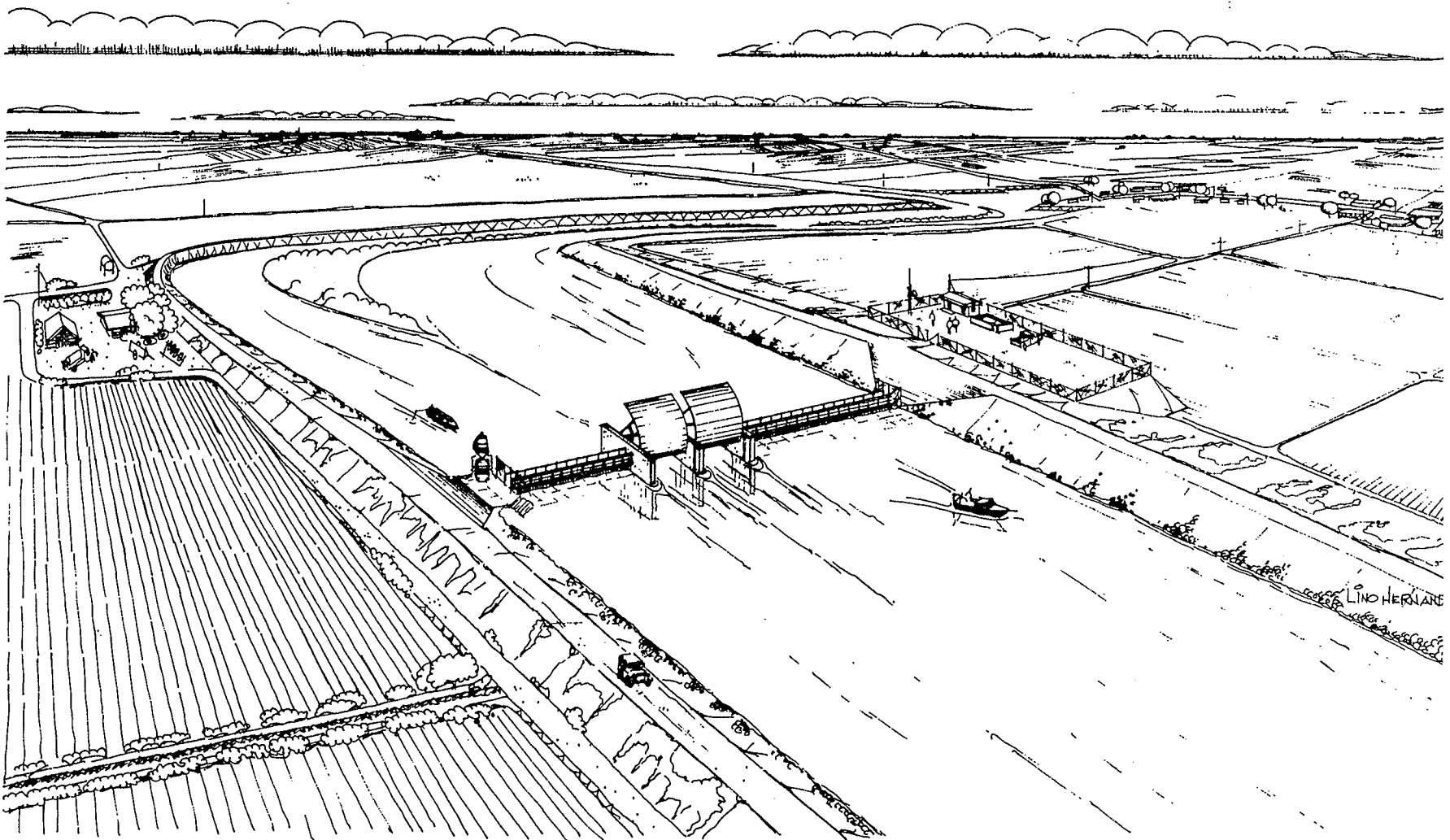


Figure 2-11. Middle River Flow Control Structure.

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Phase three would involve the construction of the steel sheet-pile wall, storage facility, and related work. Newly placed fill material would cover approximately 7,800 sq. ft. Embankment material would be imported and brought on site using improved access roads. Access/haul roads would be at least 12 feet wide and composed of gravel. Roads would accommodate large cranes (40 tons) and loaded 10-wheel trucks.

Construction for the Middle River Flow Control Structure would last approximately 18 months with a maximum construction crew of about 50 people. Estimated cost is approximately \$3.9 million.

- *Grant Line Canal Flow Control Structure*

The Grant Line Canal Flow Control Structure would be located at the confluence of Grant Line Canal and Old River. The design includes a concrete control structure that would house four 20-foot-wide by 16-foot-high radial gates, buried utility lines supplying electricity and communications to the area, access/haul road, equipment storage area, a 50-foot-wide by 105-foot-long boat lock, and a 50-foot-wide flashboard opening for emergency access and regular levee maintenance (Figures 2-12 and 2-13). Additional structures include a control building to house the control systems for the radial gates and a building to house the standby power source (propane), to be constructed in a 600-foot by 100-foot area. The control building would be constructed on top of the levee adjacent to the boat lock. Other requirements include a microwave tower and an area for flashboard storage. Fencing and gates would control access to the control and storage areas.

The flashboard structure, boat lock, and control structure would be constructed within the existing channel; therefore, relocation of the existing levees would not be necessary. Access/haul roads would be at least 16 feet wide and composed of gravel. Roads would accommodate large cranes (40 tons) and loaded 10-wheel trucks.

Construction would occur in four phases, with the first three phases requiring the use of a braced cofferdam. Phase one, construction of the boat lock, would require excavation of approximately 11,800 cu. yds. of material within the limits of the cofferdam. Construction of the radial gate structure, requiring excavation of 17,000 cu. yds. of material, would occur during phase two. Phase three, construction of the flashboard structure, would require excavation of about 2,500 cu. yds. using braced cofferdam procedures. It is estimated that 2,500 cu. yds. of excavation would be required during this phase. Upon completion of each of these three phases, the cofferdam sheet piling would be cut at the required invert depth. Phase four, construction of the permanent storage facility and additional facilities, would require that approximately 15,400 sq. ft. of the slope of the existing levee near the barrier be protected with riprap. Construction would last about 36 months with a maximum crew of 90 people. The estimated cost is \$15.6 million.

- *Old River Flow Control Structure*

The flow control structure on Old River would be located east of the Delta Mendota Canal approximately 4,000 feet southeast of the intersection of the Alameda, Contra Costa, and San Joaquin County lines. The flow control structure would consist of a concrete control structure equipped with three 20-foot-wide by 15-foot-high radial gates, steel sheet-pile wall, channel dredging, buried utility lines supplying electricity and communications to the area, access/haul road, equipment storage areas, a 50-foot-wide by 105-foot-long boat lock, 1,000 feet of new levee,

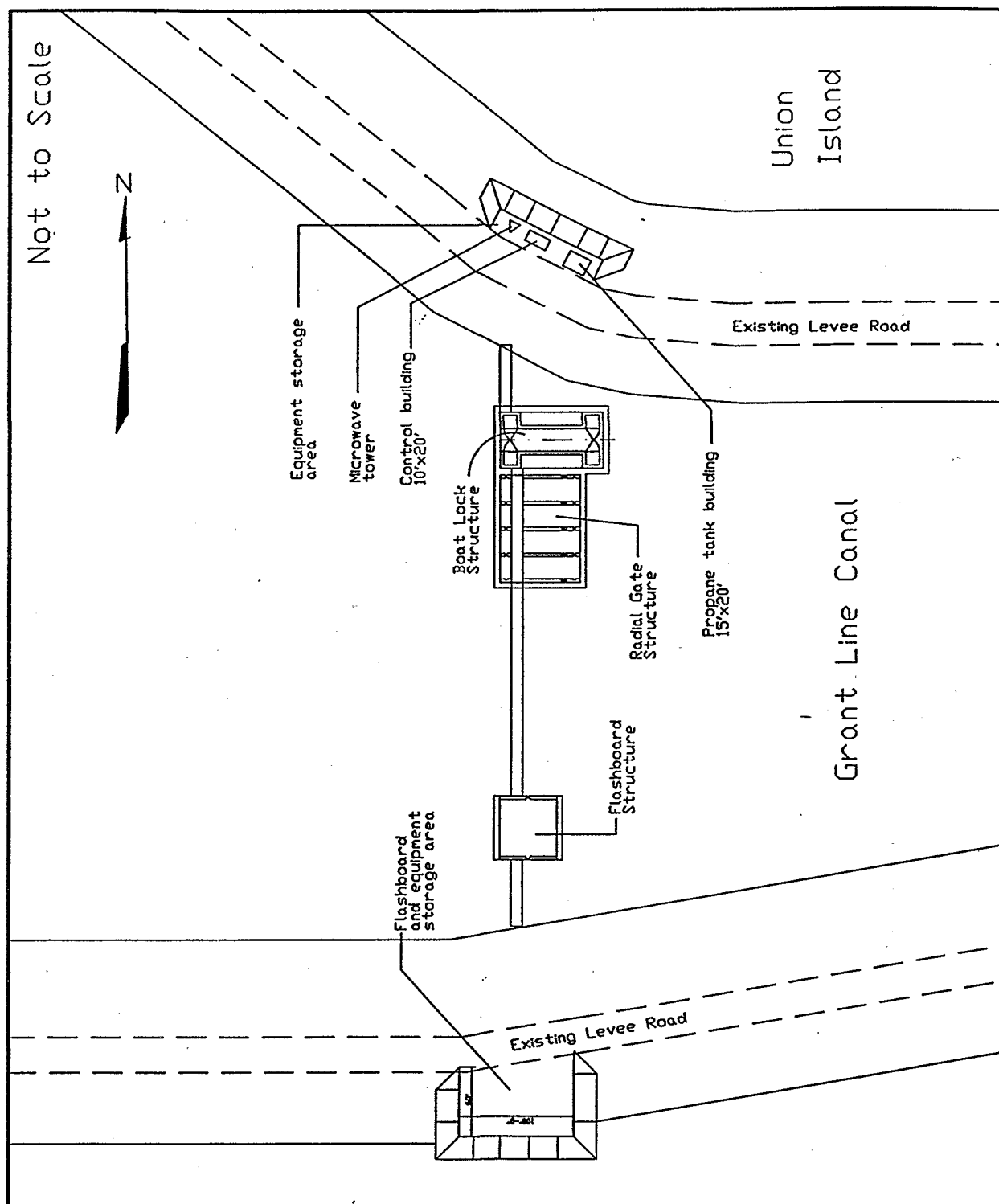


Figure 2-12. Grant Line Flow Control Structure.

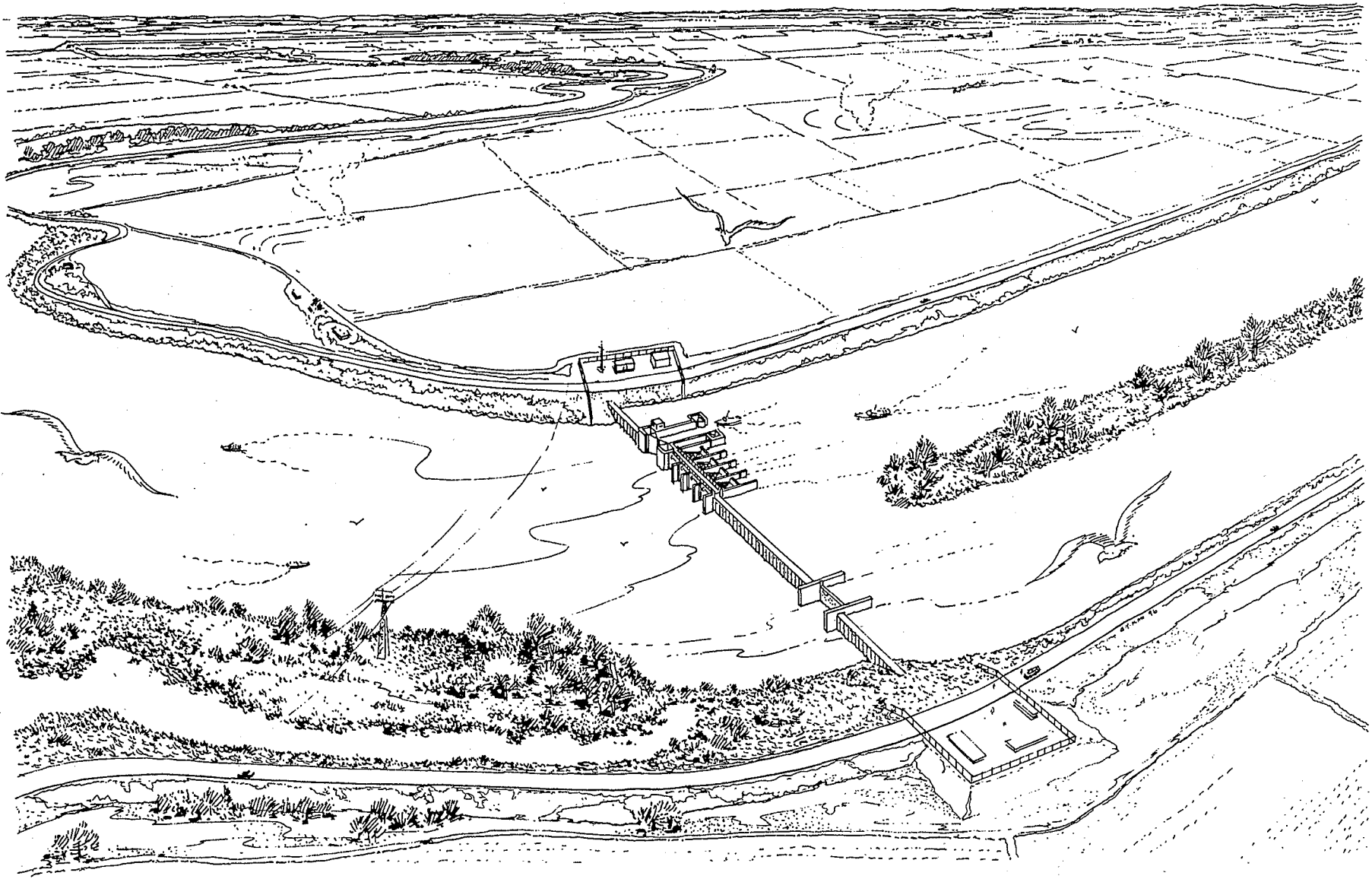


Figure 2-13. Grant Line Flow Control Structure.

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and a 50-foot-wide flashboard opening for emergency access and regular maintenance (Figures 2-14 and 2-15). Additional structures include a control building to house the control systems for the radial gates and a building to house the standby fuel source (propane). The control building would be on top of the setback levee adjacent to the boat lock. Other components include a microwave tower and an area for flashboard storage. The structure's footprint is roughly 400 feet long by 100 feet wide.

The control structure and boat lock would be constructed "in the dry" in an area just north of the existing Old River levee. The new levee would be constructed north of the existing levee. This levee would be about 1,000 feet long and would include approximately 34,400 cu. yds. of compacted embankment. The existing north levee would be breached after the structure has been constructed. Portions of the existing levee would remain as a channel island.

The new levee section would be built to an elevation of +15.0 NGVD with side slopes of 3:1. The waterside slope of the new levee section would be protected using approximately 49,000 sq. ft. of 18-inch riprap. Approximately three acres of farm land would be covered with newly placed fill material and lost to agricultural production. Levee roads would be at least 16 feet wide and composed of gravel. Roads would accommodate large cranes (40 tons) and loaded 10-wheel trucks. Imported borrow material would be required to construct access and haul roads.

A sheet-pile wall of approximately 16,000 sq. ft. would be driven adjacent to the existing levee to stabilize it during construction and to minimize the width of the levee setback. Any spoil material would be removed from the site or used as a stabilizing berm. It is assumed that the new levee setback would be constructed of imported borrow. An anchored sheet-pile wall between the boat lock and the new levee would then be constructed and backfilled to allow access to the structures from the new levee. At this point, the existing south levee could be excavated to an invert elevation of -10.0 NGVD.

The flashboard structure would be constructed within a braced cofferdam. An anchored slot would hold the steel flashboards in place. An anchored sheet pile would form the walls of the flashboard structure, absorb impacts of barges, and guide boats through the passage.

Two permanent storage areas for equipment, flashboards, and operator parking would be constructed. One storage area, to be constructed on the south side of the existing levee, would consist of a 100-foot-long by 60-foot-wide area enclosed by a fence and access control gate. The northern storage area would consist of a 25-foot-wide by 120-foot-long area also enclosed by an access control gate and fence.

Temporary haul roads would be constructed of an aggregate base and oil chip-seal design. A permanent access road of an aggregate-based chip seal design would be connected to the southern existing county road.

Construction would last approximately 30 months with a maximum crew of about 100 people. Estimated cost is approximately \$7.8 million.

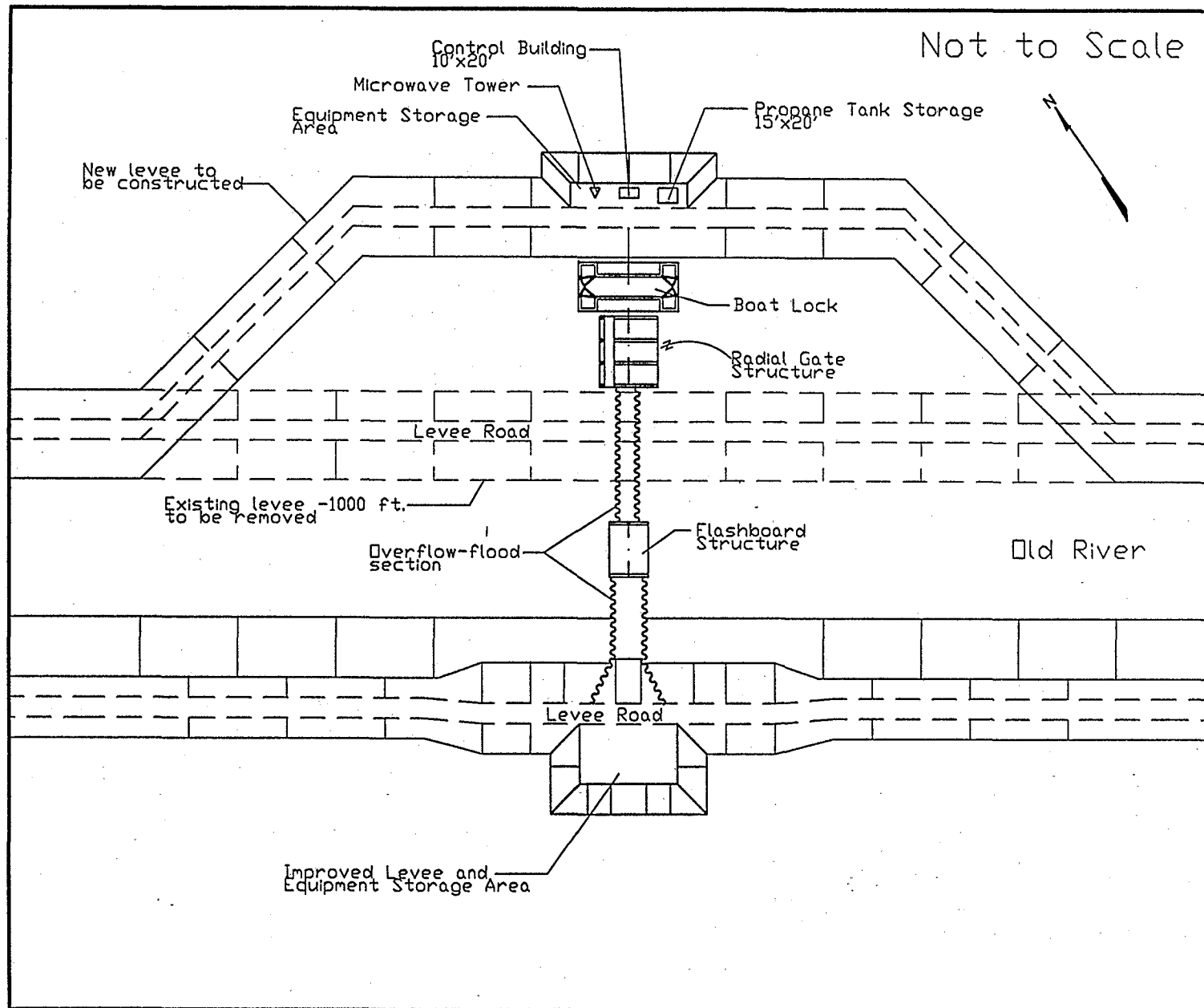


Figure 2-14. Old River Flow Control Structure.

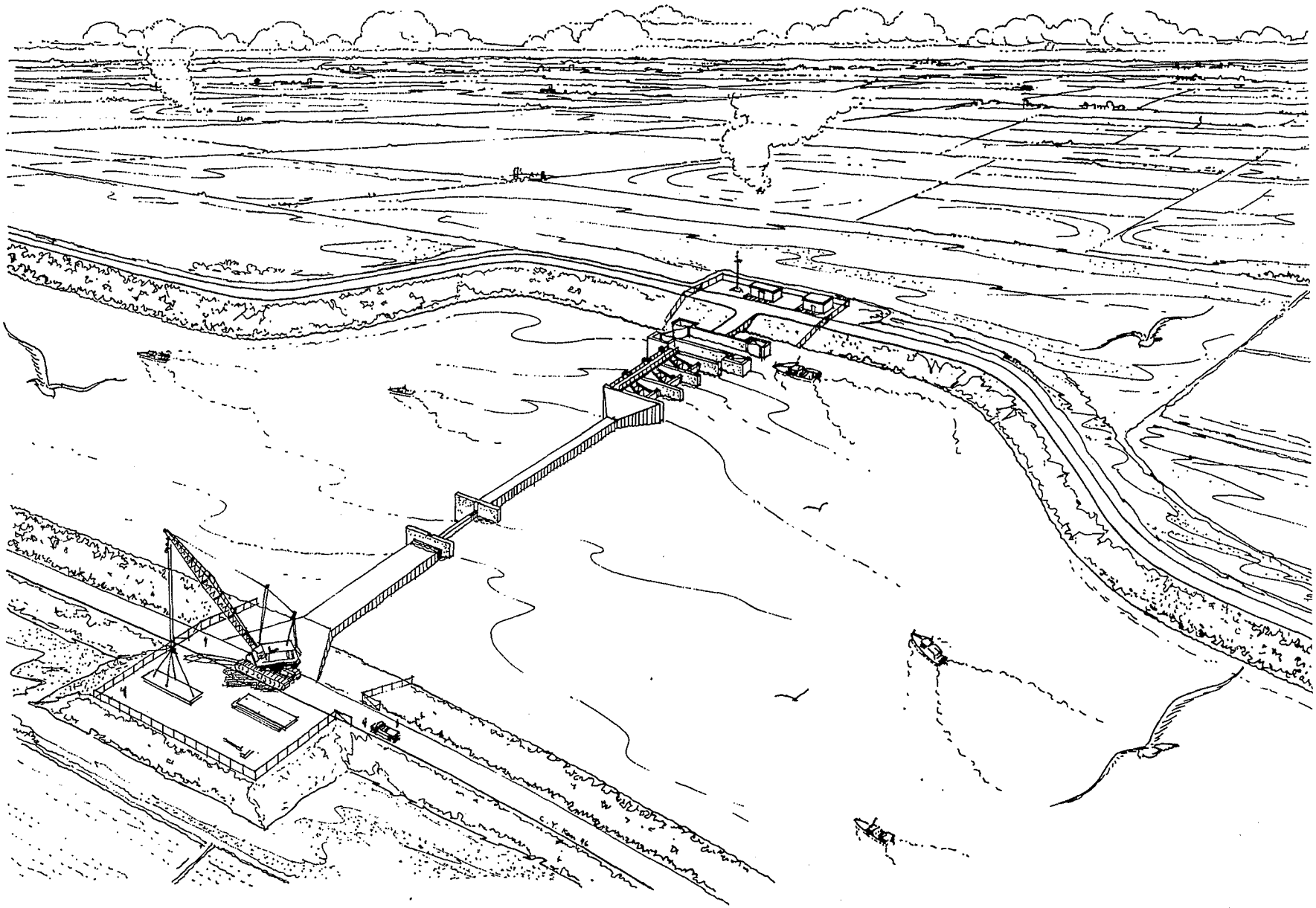


Figure 2-15. Old River Flow Control Structure.

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### *2.2.5 Component 5: Increase Diversions Into Clifton Court Forebay And Increase Water Exports*

The proposed ISDP would increase water diversions into Clifton Court Forebay, using the existing intake structure and a proposed new intake. The forebay is a shallow 31,260 acre-foot storage reservoir at the head of the California Aqueduct. The forebay provides storage and operational flexibility to alleviate the impacts of SWP exports on the surrounding Delta channels. The forebay allows Banks Pumping Plant to be operated continuously, while water diversions from the Delta can be made during times of higher tides. This practice avoids diversions from the Delta during times of lower tides, when diversions would have a more pronounced effect on existing water levels in adjacent channels. The increase in water diversions would require that the U.S. Army Corps of Engineers revise the conditions contained in Public Notice 5820-A and issue a permit under Section 10 of the Rivers and Harbors Act allowing for such diversions. All diversions would continue to be subject to compliance with other existing constraints governing the operation of the SWP, such as State Board water rights decisions and applicable federal and State laws, including the Endangered Species Act and the Clean Water Act.

The proposed diversions into Clifton Court Forebay would not exceed, on a monthly averaged basis, 20,430 acre-feet per day for any given month, where diversion are currently limited to 13,870 acre-feet daily (and 13,250 acre-feet over a three day average). The maximum allowable pumping at Banks Pumping Plant would increase to 10,300 cfs. Currently pumping is limited to 6,400 cfs (rated), unless flows in the San Joaquin River are above 1,000 cfs during mid-December to mid-March, when the SWP can divert 33 percent of the amount of the river flow in addition to the 6,400 cfs. This would allow DWR to utilize the full pumping capability of the plant during certain periods.

Over the course of most years, more water would be pumped from the Delta with the proposed ISDP. The average annual increase in water pumped from Banks Pumping Plant and delivered to SWP contractors with the proposed ISDP would be 46,000 acre feet, based on 1995 demand and existing facilities. Based on 2020 future demand and assuming full build out of the SWP, the proposed ISDP would provide on average an additional 120,000 acre feet per year of water to SWP contractors.

The increased capacity at Banks Pumping Plant would allow pumping to be shifted to those times of year when the volume of fresh water flowing out of the Delta exceeds that required to meet regulatory standards. More water would be pumped when Delta inflows are high, during the late fall and winter precipitation and runoff events, while less water would be pumped during the drier months, when upstream reservoir releases are required to meet Delta regulatory standards.

The use of the additional pumping capacity would vary depending upon the water year. During dry and critically dry years, the full pumping capacity would generally be limited to rare storm events. During wet, above-normal, and below-normal years, there would be opportunities to use the maximum pumping capacity. In above-normal and below-normal years, the additional water that would be pumped and exported could be a significant percentage of freshwater inflows.

### *2.3 Operational Coordination Of The SWP And the Proposed ISDP*

This section describes how DWR and Reclamation coordinate their operations to ensure that all regulatory standards in the Delta are met. It also discusses the regulatory framework which applies to the Delta.

DWR and Reclamation would continue to coordinate the operations of the SWP and CVP with the proposed ISDP to assure that the various Delta regulatory requirements continue to be met following implementation of the proposed ISDP. This coordination would continue to involve joint planning of the operations to achieve the target levels. It would also continue to involve joint monitoring of project operations and Delta conditions to ensure that planned operations are adequate and project operations are adjusted as necessary. The procedures, which are to be continued with the proposed ISDP, are implemented as follows.

To plan weekly project operations, Bay/Delta tides are estimated using the National Oceanic and Atmospheric Administration's forecasted tides and regression relationships with flow and salinity at various Delta locations. Based on the best estimates of weather conditions and past experience, a target Delta outflow is determined that is expected to meet the controlling water quality standard, as well as other standards. DWR attempts to provide a reasonable buffer level of protection for complying with all pertinent Delta water quality standards. DWR and Reclamation coordinate reservoir releases to meet the target outflow:

During actual daily project operation, data are transmitted hourly to DWR and Reclamation hydrometeorological systems. These data consist of river flows, tides, salinity, and wind speed/direction at various Delta locations. If the data indicate a significant deviation from the planned conditions, then one or more of the three following operational changes can be implemented: (1) adjust project reservoir releases; (2) adjust Delta export levels; and (3) close or open the Delta Cross Channel gates. Reservoir releases are most effective for meeting Sacramento River salinity criteria (most frequently at Emmaton) or Delta outflow criteria. San Joaquin River salinity criteria (most frequently at Jersey Point) are most effectively met by adjusting the amount of export pumping.

Regardless of the operating strategy, SWP and CVP operations significantly influence salinity only at locations where project operations significantly influence tidal circulation, such as in the main channels of the Sacramento and San Joaquin rivers. At other locations, such as the Contra Costa Canal intake at Rock Slough, tidal circulation is generally poor, and salinity can be strongly influenced by local discharges of land-derived salts. Changes in project operations will influence the water quality only marginally at Delta locations with these physical limitations.

### *2.4 Hydrologic Conditions And Changes*

Delta hydrodynamics can be described by freshwater inflow and outflow; withdrawals for export and in-Delta use; and, variation in Pacific Ocean tides. Runoff from Central Valley rivers and streams accounts for 90 percent of the freshwater inflow to the Delta, with the Sacramento River basin accounting for 70 percent, the San Joaquin River accounting for 15 percent, and the Consumnes, Mokelumne, and Calaveras Rivers (Eastside Streams) accounting for 5 percent. Inflow from the Sacramento River is highest in winter and early spring (due to rainfall), while inflow from the San Joaquin River is highest in late spring (due to snowmelt). Delta outflow can

be divided into the out flow required by regulatory standards and "surplus" outflow. Outflow is highest in winter and spring, corresponding to peaks in Sacramento River inflow. Although Delta outflow repels salt water intrusion from the ocean, tidal currents can shift the mixing zone between fresh and saline water by two to six miles, sometimes reaching into the Delta during periods of low outflow. Delta water is removed: 1) by the SWP, the CVP, and the Contra Costa Water District for export; and, 2) at approximately 1,800 local agricultural diversions for within-Delta use. Recent SWP entitlements and other deliveries have ranged from 2.0 to 3.1 MAF annually, while the SWP contractors' demand is estimated to be 4.1 MAF by the year 2010. These and related aspects of Delta hydrodynamics are presented in greater detail in Appendix 3.

Two quantitative studies were conducted to evaluate the hydrodynamic effects of the proposed ISDP and its alternatives: 1) water supply studies using the DWRSIM model, a 71-year record of historic hydrology from 1922 to 1992, at the existing level of demand and 2020 level of demand; and, 2) Delta hydrodynamic studies using the DWRDSM model for representative worst-case critical (1991), dry (1981), below-normal (1966), above-normal (1957), and wet (1982) water years. The requirements of the December 1994 Bay-Delta Accord are used to constrain the modeling studies. The changes to hydrodynamics are generally slight, but even subtle changes in water quality and hydrodynamics can impact fish, wildlife, and other biotic resources. Further interpretation of the effects of hydrodynamic changes are discussed in the relevant technical chapters.

The methods and results of the modeling studies are comprehensively described in Appendix 3 and are briefly summarized in this paragraph. The proposed ISDP has little effect on Delta inflow, since this portion of the SWP is already operated to optimize exports. The pattern of SWP exports is changed by the proposed ISDP, with export increases occurring September through December and export decreases occurring January through August (except for slight increases in June or July). Delta outflows are also altered corresponding to the changes in SWP exports. The combined effects of the shift in timing of export pumping and the operation of the barriers affects the flow patterns in the south Delta. The barriers cause improvements to south Delta water levels and circulation by allowing upstream flow during the flood tide and blocking downstream flow during the, ebb tide (tidal pumping). The barriers also route the San Joaquin River flows downstream toward the central Delta, rather than through the south Delta towards the export pumps.

## *2.5 Regulatory Framework*

The existing regulatory and legal framework governing operation of the water projects and water management in California consists of a combination of federal, state and regional laws, policies, agency decisions, permit requirements, and agreements relating to water rights, biological resource protection, waterway modification, and water project management. These regulations are additional to the environmental review of projects through the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA). This document satisfies the documentation requirements of NEPA and CEQA. Appendix 4 discusses the applicable regulatory and legal requirements that affect the proposed ISDP in the following area: (1) water quality; (2) water rights; (3) biological resource protection; (4) waterway modification; and (5) Statewide water project management.

### *2.5.1 Use of the DEIR/EIS*

Information presented in this DEIR/EIS will be used by regulating and permitting agencies in their evaluation of the proposed ISDP permit applications for: constructing and operating a new intake structure at the SWP Clifton Court Forebay; constructing and operating three flow control structures; constructing and operating a seasonal barrier; channel dredging along a reach of Old River; and to meet Bay-Delta estuary water quality and flow requirements.

This Draft EIR/EIS will also be used by the U.S. Army Corps of Engineers to support review of application to increase diversions into Clifton Court Forebay (Section 10 Rivers and Harbors Act). This DEIR/EIS and the information collected during the environmental analysis will also be used by Department of Fish and Game, the U.S. Fish and Wildlife Service and the National Marine Fisheries Service to satisfy requirements and to support environmental review and consultation required under other laws and regulation, such as the federal and state Endangered Species Acts. This DEIR/EIS may be used by other state and federal agencies for compliance with CEQA and NEPA for other requirements necessary for the proposed ISDP project. Chapter 24, "Summary of Permit and Environmental Compliance", describes these requirement for the proposed ISDP project. The DEIR/EIS also serves as a full-disclosure document for the public to ensure that interested parties have an opportunity to express their views and concerns about the proposed ISDP project.

Following is a list of agencies that are expected to use the DEIR/EIS in their decision-making.

#### *FEDERAL*

U.S Army Corps of Engineers (USACE)  
U.S. Fish and Wildlife Service (USFWS)  
National Marine Fisheries Service (NMFS)  
Environmental Protection Agency (EPA)

#### *STATE*

California Department of Fish and Game (DFG)  
California Department of Water Resources, Division of Safety of Dams  
The Reclamation Board  
State Water Resources Control Board (SWRCB)  
Regional Water Quality Control Board (RWQCB)  
State Lands Commission  
California Division of Mines and Geology  
Office of Historic Preservation and Advisory Council on Historic Preservation  
Native American Heritage Commission

#### *LOCAL AND REGIONAL*

Air Pollution Control Districts  
Contra Costa County Planning Department  
San Joaquin County Planning Department  
Reclamation Districts  
Individual Land Owners

Chapter 24, Table 24-1 lists the possible permits required for the completion of the proposed ISDP project. These permits will be issued depending upon the review of the project and approvals that will be required whether they be in the form of a memo or an issuance of a permit.

## *2.6 Related Delta Activities*

### Central Valley Project Improvement Act of 1992

On October 30, 1992, the President signed PL 102-575 into law, title XXXIV of which is the Central Valley Project Improvement Act. The Act is the first major piece of legislation to deal with the CVP since the Reclamation Reform Act of 1982. The act makes significant changes to the management of this federal reclamation project, and creates a complex set of new programs requirements applicable to this project.

Section 3406 (b)(15) of the act directs the Secretary of Interior to, "construct ... a barrier at the head of Old River to be operated on a seasonal basis to increase the survival of young outmigrating salmon... in a manner that does not significantly impair the ability of local entities to divert water".

When the flow and fish control structures discussed in this chapter are used together, they partly mitigate each other's adverse effects. The fish control structures prevents San Joaquin salmon from being trapped behind the flow control structures; while the flow control structures prevent the fish control structures from adversely affecting water levels and water quality for Delta farmers and resident fish.

As a result, the ISDP proposed project is fully compatible and complementary with the CVPIA since the fish control structure at the head of Old River partly mitigates for the adverse effects of the flow control structures at Middle River, Old River near Tracy, and Grant Line Canal. These four structures as designed, work to meet the objective of "improving water levels and circulation in south Delta channels for local agricultural diversions," (page 1-1) while meeting the objective of CVPIA, as stated above.